



# Booking P1 Reserves for Recompletion/Refrac Candidates in Unconventional Wells

- 
- Mark Fleming
  - December 7, 2023

# Author BIOs



Mark is a Senior Petroleum Engineer with over 30 years of oil and gas experience and has held various petroleum engineering positions with Chevron, EOG and Hess.

Mark has served in risk management roles in the oil and gas financial sector with both SunTrust and DNB banks. Mark has also participated in the successful start-up of two oil and gas related entities.



Bob has over 41 years of practical experience in the petroleum industry as a petrophysicist and completion optimization advisor. He has published over 40 total papers to date on the integration of petrophysics with fracs. He teaches the refrac optimization and organic shale petrophysical analysis courses for Subsurface Consultants and Associates worldwide.

He was a SPE Distinguished Lecturer (1995-96) and was nominated for next year's program to speak on refracturing organic shale wells.

# Credit for Prior Work



Global Energy & Commodities  
Private Equity Firm

## Refrac Integration in the Capital Deployment Plan

**Samantha Holroyd, P.E.**  
**Technical Director**

December 2015

# What's all the fuss about

1

Recent acquisition and consolidation activity points to a possible new drill inventory shortage.

2

Analysts – more activity to come.

Some are growing from within - "ConocoPhillips Sticking to 10-Year Plan"

3

All signs point to developing current acreage.

# Refracs gaining recognition

JPT November 2023



American Oil and Gas Reporter Aug 2022



ARTICLE BY  
**BOB BARBA**  
INTEGRATED ENERGY  
SERVICES

Operators have been on a steep learning curve with organic shale frac treatments since the first Barnett Shale horizontal multistage fracs in the early 2000s. It was known early on that it takes 100 days for a gas molecule to travel 1 meter in 100 nanodarcy rock, thus organic shales have close to zero permeability unless the rock is stimulated with a frac treatment. Nonetheless, it took until 2015 through 2016

This shows that 85% of the rock was not being drained with the 50-ft cluster spacing. The 15% of the total rock volume that was physically drained correlates to a 2.25% recovery factor, which is in the range that is frequently observed with cluster spacings of 50 ft or greater. There is a strong correlation

Entire conferences now on refracs

**7TH ANNUAL REFRAC WELLS 2023**  
SHARING RESULTS FOR REFRACTURING WELLS

September 13 - 14, 2023  
South Shore Harbour Resort,  
Houston, Texas, USA

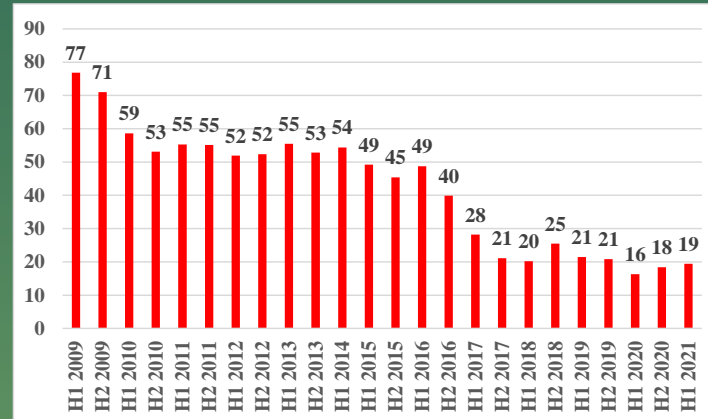
**SPE Workshop: Refracturing: A Proven Strategy to Maximize Economic Recovery**

14 - 15 Aug 2023 | Grand Hyatt Denver | Denver, Colorado, USA

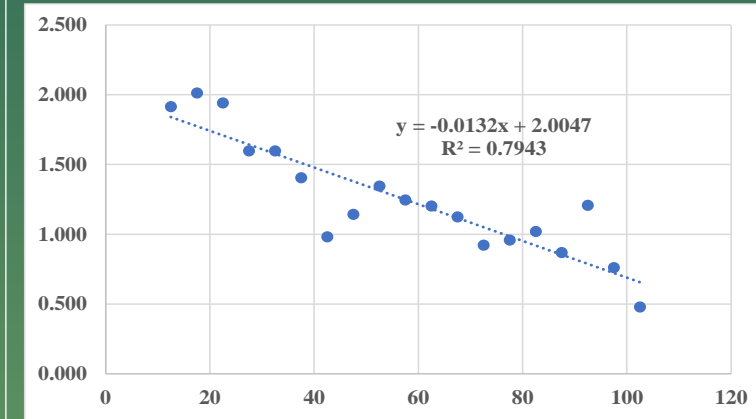


# What's the Secret – cluster spacing

Cluster Spacing: There is a direct correlation between increased cluster spacing and increased recovery



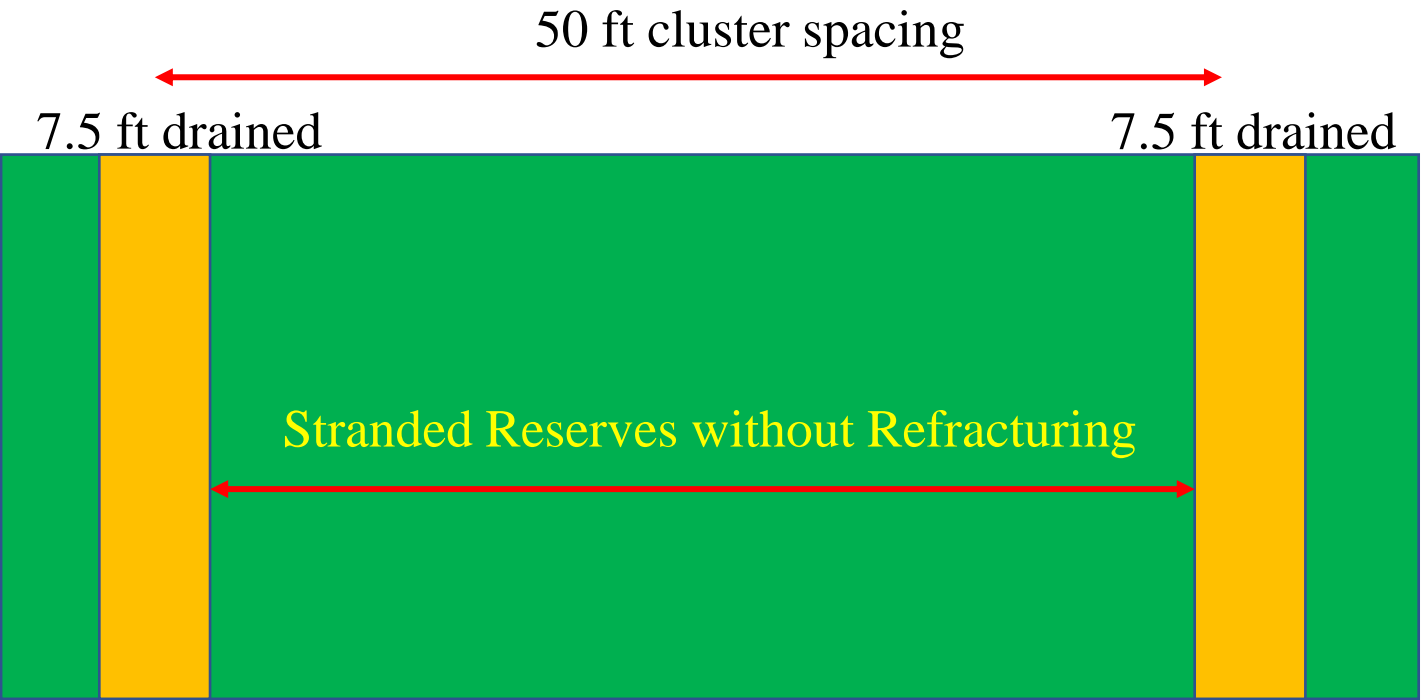
Cluster Spacing (ft) over time



Normalized EUR vs Cluster Spacing

SPE 212371 Barba 2023 SPE HFTC Haynesville Study

# Inefficient Cluster Spacing

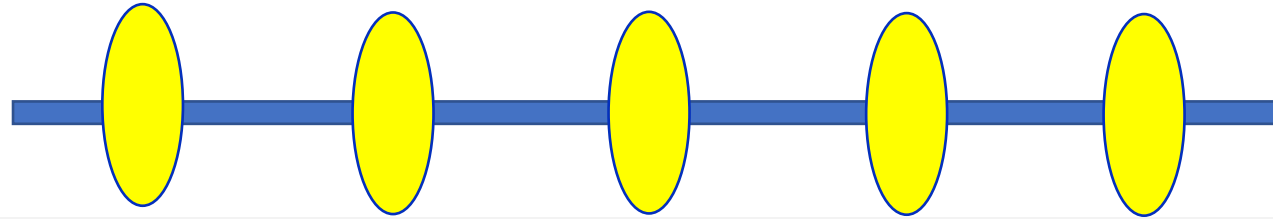


Pilot done in 2016, COP is now one of the most active refrac operators in the Eagle Ford

# Refracs vs Re Completions Nomenclature (Part 1)

## Refracs

Bull head frac – pump down the existing setup



Economic, but not sustained

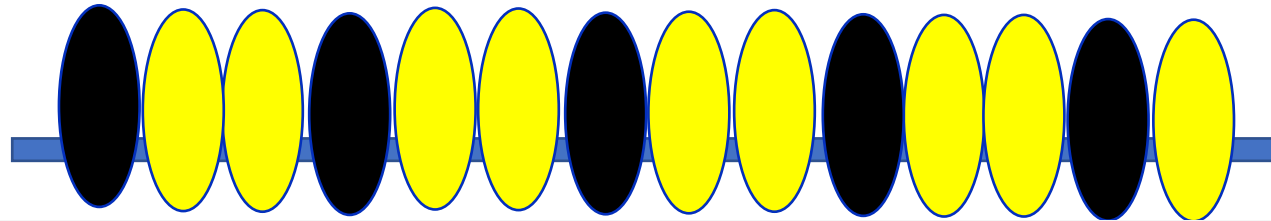




# Refracs vs Recompletions Nomenclature (Part 1)

## Recompletion

Mechanically Isolated “recompletion” – liner with new perms, old perms shut off, same frac job as a modern well

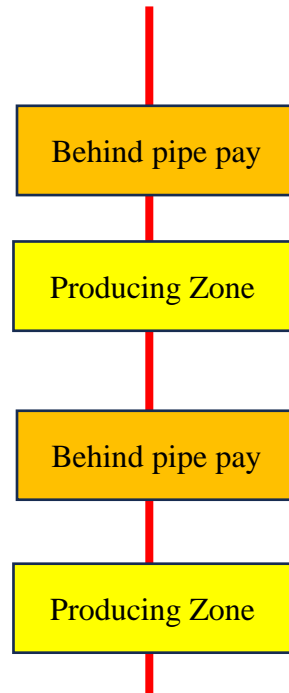


NPV is 10% higher than a new well based on current pricing and P50 forecasts



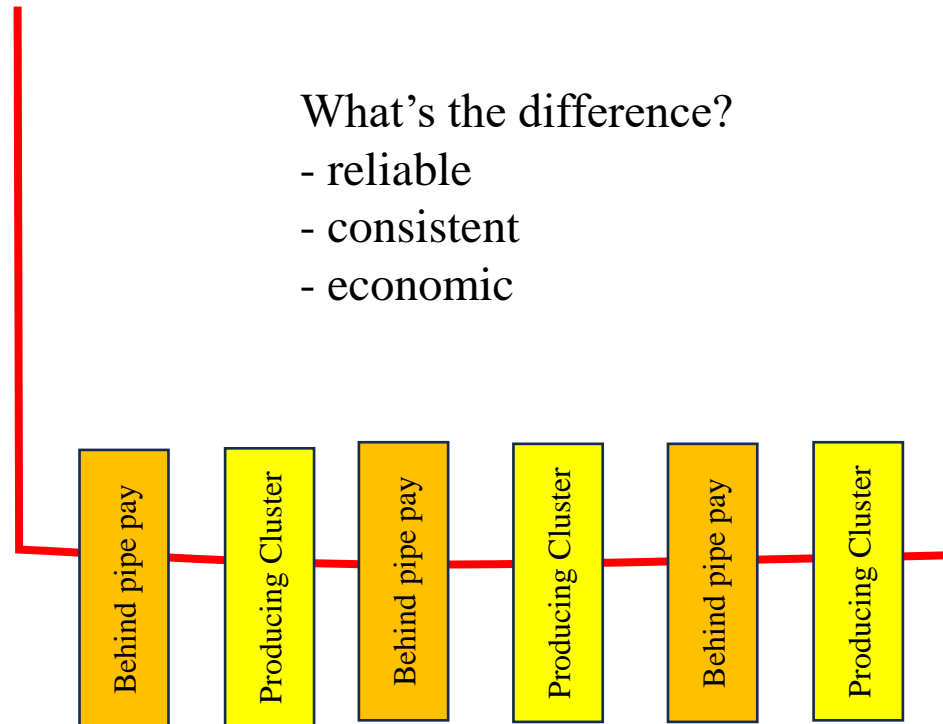
# Recompletions vs Refracs

Can be booked under PRMS



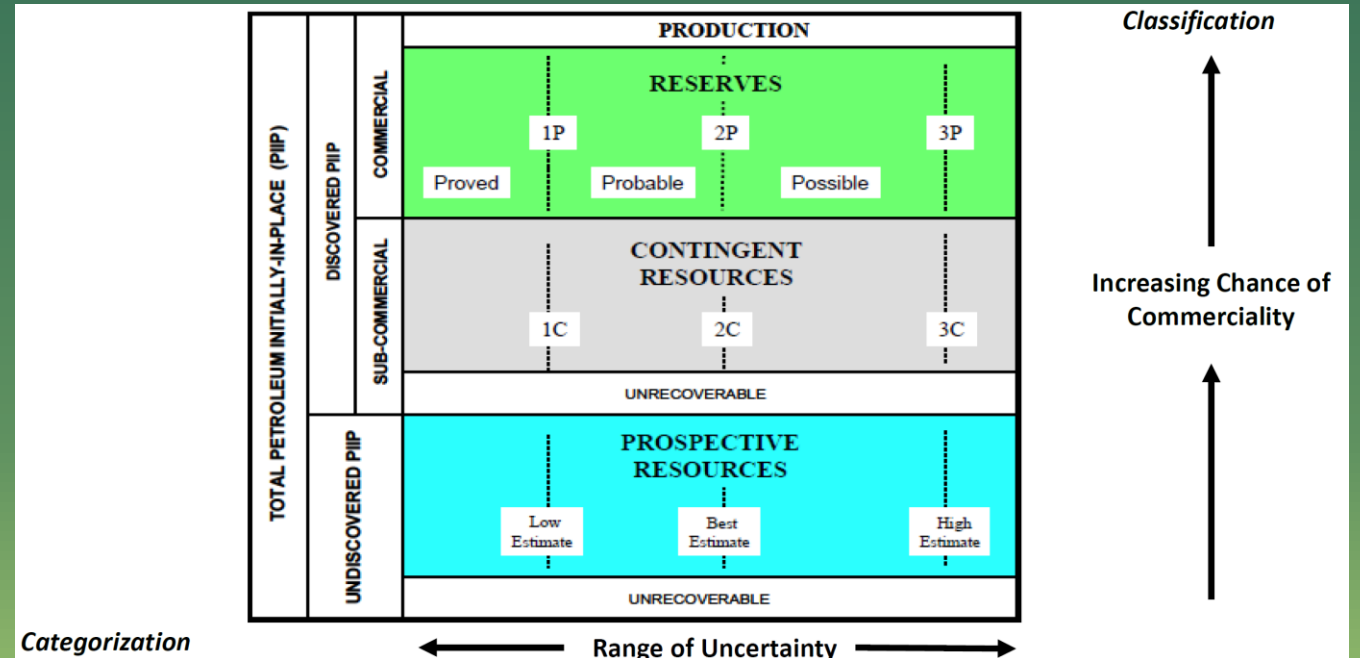
What's the difference?

- reliable
- consistent
- economic



# Where do refracs belong?

(what's the commerciality and risk compared to a traditional recomplete or new well)



# What's the Prize ?

Recompleting 10% of the candidates using the P50 estimate would add over 1 million bbl/d to US production!

Over 36,000 wide-spacing candidates in the organic shale plays

Refrac Candidates vs Known Refracs		
	<b>&gt;=50 ft CS</b>	<b>Known</b>
<b>Organic Shale</b>	<b>Candidates</b>	<b>Refracs</b>
Eagle Ford Oil Wells	12387	87
Eagle Ford Gas Wells	2613	110
Haynesville	3000	170
Marcellus	9950	WIP
Permian	4950	WIP
Woodford Oil	896	WIP
Woodford Gas	2506	WIP

# Things to Consider and Suggestions

- What category should they be in?
  - Refracs (P1a)
  - ReCompletes (P1b)
- How many can be booked?
  - Does the newest SPEE Monograph allow for this?
- Well selection and data important
  - not all wells are viable candidates (spacing, prior completion, orientation, etc)
  - Data hard to find if you aren't the operator
- Has the reliable technology clause already been met?
  - Depends on the basin
  - Does a new operator need to prove they can execute first
  - Can everyone book
    - Operators
    - Non Op?
    - Royalty?
- Does SPEE or PRMS need to specifically address refracs?

# Get in Touch

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